

CONVENTION ON INTERNATIONAL TRADE IN ENDANGERED SPECIES
OF WILD FAUNA AND FLORA

Eleventh meeting of the Conference of the Parties
Gigiri (Kenya), 10-20 April 2000

Interpretation and implementation of the Convention

TRADE IN SEAHORSES AND OTHER MEMBERS OF THE FAMILY SYNGNATHIDAE

1. This document has been submitted by the United States of America and Australia. The Secretariat is grateful to the United States of America for providing the Spanish translation and to Australia for providing the French translation.

Purpose

2. The intent of the United States and Australia in requesting that this issue be discussed by the Conference of the Parties is to:
 - a) establish dialogue between Party members, concerned scientists, interested industry members, and communities;
 - b) further encourage continued research to clarify taxonomic discrepancies and compile species distribution and demographic data; and
 - c) further encourage the collection of data quantifying international trade, documenting catches by species, as well as data that will provide the best information about the current status of these species and impact trade has on syngnathid populations and their environments.

Introduction

3. At the present time, there is no international organization or body responsible for management of seahorses and other syngnathids, including recommendations on catch quotas, gear restrictions, minimum sizes, or temporal and spatial closures of near-shore fishing environments. Significant work is being conducted with some local communities, scientists and industry by Project Seahorse, led by Dr. Amanda Vincent of McGill University, Canada. The United States and Australia believe that discussion of actions that are necessary to collect trade data and determine the impacts of trade on seahorse and other syngnathid populations is essential at this time, in an effort to determine the validity of anecdotal information that populations are being harmed by excessive harvest and trade. Lastly, discussion between all interested parties must determine if the trade may be effectively regulated within the framework of CITES.
4. The purpose of this paper is to promote discussion between Party members, researchers, and interested trade entities, in an effort to advance the sustainable use of a family that is extremely vulnerable to over-exploitation due to its life history characteristics. We believe that increased research efforts to elucidate basic population demographics, distribution and trends are necessary, as well as husbandry efforts with a goal of reducing pressure on wild populations and promoting sustainable harvest schemes. We believe it is of the utmost importance to build a strong working relationship with TCM dealers and practitioners, in an effort to promote trade of sustainably harvested syngnathids. Likewise, we advocate reducing consumption through curtailment of waste, and the investigation of acceptable non-vulnerable substitutes for seahorses to be used in TCM. These actions would further progress the number of initiatives already underway, for example within Project Seahorse.

5. Seahorses inhabit shallow coastal waters, world-wide, and are harvested for curios, aquarium specimens, and use in Traditional Chinese Medicine and its derivatives (TCM). Eastern medicinal use dates back to at least the 14th century, while early Greek and Roman herbalists mention the medicinal properties of seahorses as a cure for rabies, among other illnesses (Vincent, 1996). Although Western medicine no longer uses seahorses or pipefishes, demand in the East has never been higher, particularly with rapid economic growth in China.
6. Seahorse and other syngnathid populations are believed to have declined world-wide, although there is little concrete harvest and trade data to support this belief. Habitats favoured by seahorses include seagrass beds, coral reefs, and mangroves; these habitats are often located in heavily populated coastal areas and are subject to pollution, habitat degradation and loss, and over-harvest.
7. Relatively little fieldwork has been conducted to quantify current distribution, population, and demographic information regarding seahorse populations. However, anecdotal information gleaned from fishers, traders, and TCM dealers indicates that populations have declined over 25-75% during the last five years (Vincent, 1997). Size of individuals has also declined, with an increase in take of immature males, which may have grave implications for reproductive potential. Intensive harvest of wild seahorse populations is believed to be unsustainable due to biological factors including: sparse distribution, low mobility coupled with small home ranges, low natural adult mortality, and a reproductive strategy that is characterised by low fecundity, lengthy parental care, and mate fidelity (Vincent, 1996).

Taxonomy

8. Seahorses are teleosts, or bony fishes, and are classified as members of the class Osteichthyes, order Syngnathiformes, family Syngnathidae. The family Syngnathidae includes seahorses, pipefishes, pipehorses, and sea dragons (Lourie et al, 1999). There are approximately 215 species in 52 genera (including seahorses) (Dawson, 1985). Previous analysis indicated at least 35 species of seahorses in the genus *Hippocampus*; all but four of which are designated as "vulnerable" (IUCN, 1996). The level of threat to these species is currently under review. Recent morphometric and genetic analysis conducted in an attempt to clarify what is generally considered a tangled taxonomy, suggests the existence of 32 species of seahorses; efforts to further simplify the taxonomy continues (Lourie et al, 1999). Certain genera of pipefishes are commonly known as pipehorses, largely because they appear to be intermediate in form between seahorses and pipefishes, but the designation is rather vague.

Biological parameters

9. **Distribution, behavior and ecology:** A cosmopolitan taxa, syngnathids are found world-wide from the tropics to cool temperate regions in marine, freshwater and estuarine habitats within a latitudinal belt ranging between 45° North to 45° South. Pipefish can be found to depths of over 400 m (Dawson, 1985). The two species of seadragons are endemic to Australian waters. Seahorses thrive in shallow coastal temperate and tropical waters, particularly in the Western Atlantic Ocean, and the Indo-Pacific region. The Indo-Pacific region is particularly rich in available habitat and also has the greatest number of species: Australia has eleven currently recognized species of seahorse and Southeast Asia and Japan have at least seven seahorse species living in their waters (Lourie *et al.*, 1999). By contrast, only four species are known to inhabit the coastal waters of the Western hemisphere. Seahorses live in seagrass and kelp beds, mangroves and reefs, protected habitats where food is readily available. Studies indicate that they often occupy only the edges of seagrass beds, leaving large areas of suitable habitat unoccupied (Vincent, 1996). Although some species have been found at depths ranging between 45-60m, most species prefer to live at depths less than 20m.
10. Threats to seahorses include: over-harvest for commercial trade, degradation and loss of habitat, and deteriorating water quality as a result of pollution and encroaching human development. Seahorses are globally exploited for use as traditional medicines, aquarium fishes, and curios.
11. Seahorse populations, once in decline, are not easy to restore, due to their unique lifestyle habits. Population density tends to be low for most species. *Hippocampus whitei* in Sydney, Australia, occurs at densities of about one per six square metres in mixed seagrass habitats (Vincent, 1996). Observations by fishers suggest that this is typical of many seahorse species, although densities as

high as 10-15 seahorses per square meter in coastal India have been reported. Off Western Australia, the Short-headed seahorse (*Hippocampus breviceps*), is known to occur in colonies numbering in the hundreds.

12. Seahorses move slowly throughout a small home range; they lack the caudal fin and a streamlined growth form that allows for rapid movement in other fishes. They are, however, highly manoeuvrable within their limited home range. Most male seahorses occupy a home range of approximately one square meter or less, particularly during the breeding season. Female seahorses occupy a home range as extensive as 100 square meters, possibly an adaptation that reduces competition for food between a breeding pair (Vincent, 1996). Slow swimming movements, combined with a limited home range, may delay re-colonization of areas from which they have been removed. Juvenile dispersal mechanisms are poorly understood, although it is believed that monsoons and other storms may play a key role (Vincent, 1996). For example, *H. breviceps* is found in floating marine algae carried by ocean currents off Western Australian coasts released following rough weather. Occasionally, syngnathids can be found in the open ocean associated with floating Sargassum.
13. The life span of seahorses is unknown, but has been inferred to be about four years for most medium sized Indo-Pacific species (Vincent, 1997). Little information is available regarding natural mortality rates and population demographics. Based on a study of *H. whitei*, researchers believe that natural adult mortality is low; however, further studies are required to determine if this is true for all seahorse species. Predators of seahorses include large pelagic species such as tuna and Dorado; skates, and rays; as well as crabs, water birds, and penguins also feed on seahorses (Vincent, 1996). Juvenile seahorses exhibit high mortality rates as a result of predation. Juvenile and adult seahorses alike are vulnerable to storms because of their weak swimming ability.

Reproduction

14. On average, seahorses reach sexual maturity between six months and one year of age (Vincent, 1996). Unlike other species, the male develops a brood pouch; the female deposits her eggs within the brood pouch, where they are fertilized. Pregnancy lasts 10 days to six weeks, depending on species location and environmental conditions including light, temperature, salinity. At the end of this period, the male seahorse goes into labor, eventually releasing its brood. No further parental care is provided after birth. Most species produce 100 - 200 young per pregnancy, although smaller species (e.g. *Hippocampus zosterae*) may release only about five offspring (Vincent, 1990). The maximum known brood size for seahorses is 1572 young (Vincent, 1990). Although seahorses may reproduce up to 7 times each year, they generally exhibit lower fecundity rates than most other marine fish. Additionally, male brooding habits have been responsible for a low rate of dispersal and consequent clinal variation in at least some populations (Gomon, 1997).
15. Low fecundity and dispersal rates are not the only attributes that make these species poor candidates for intensive harvest. Many seahorse species are considered to be sexually faithful and form strong pair bonds that are easily disrupted by fishing. Site fidelity and low encounter rates increase the amount of time necessary to re-pair, a factor reducing the reproductive potential of the species (Vincent, 1996).
16. In all pipefish species, males care for the eggs but genera exhibit different degrees of brood pouch development, from simply glueing embryos to the ventral surface of the male's tail to the fully sealed pouch of a seahorse. Full grown males of both seadragon species incubate about 250 eggs at a time under the tail.
17. Project Seahorse is planning to conduct a workshop in May 2000 on seahorse biology in order to collate research findings and discuss new directions of study. One goal is to develop an international action plan for seahorses and their relatives by the end of 2000 (Vincent pers. comm.).

International trade

18. At least 46 nations and territories are currently trading in seahorses (Vincent pers. comm.). The largest known exporters are India, Indonesia, the Philippines, Thailand, and Viet Nam. Annual exports for each of these countries is estimated to range from 3-15 tons of dried seahorses. Seahorses comprise 80-100% of the income of some fishers in the Philippines and India, and are among the

most valuable export fisheries from Viet Nam and the Philippines (Vincent, 1995). A more detailed analysis of the trade in syngnathids can be found in the Annex of this paper.

19. The largest importers of dried seahorses are China, Hong Kong and Taiwan, with an estimated annual consumption of 45 tons in Asia, representing 16 million individuals (at approx. 2.8 grms per individual). Seahorses are sold as whole, dried specimens that are used in tonics and other preparations. Medicines derived from seahorses are used to treat a variety of conditions such as: asthma, arteriosclerosis, impotence, incontinence, thyroid disorders, broken bones, skin ailments, and heart disease (Lourie *et al.*, 1999). Tonics compounded using herbs, whole seahorses, and alcohol are particularly popular to improve male sexual function. There has been a recent increase of pre-packaged prepared medicines in Asia, possibly in response to decreases in size of wild-harvested individuals.
20. Seahorses are also used in traditional medicines in Indonesia, the Philippines and India; at least eight seahorse medicines are now sold in North America (Fratkin, 1986). Demand for medicinal purposes increased 10-fold during the 1980s, and continues to grow by 8-10% per year in China alone; similar trends are likely to occur in other countries with large ethnic Chinese populations. Dried seahorses are also utilized as curios, with a high availability in beach resorts and shell shops around the world.
21. Live specimens for the pet trade are exported primarily to North America, Europe, Japan and Taiwan. Five species are preferred by hobbyists, including four Indo-Pacific species in the *H. histrix* complex and *H. kuda* complex, and one North American species, *H. erectus*, although several other species are sold as well. Virtually all seahorses marketed in the pet trade are harvested from the wild. Seahorses are considered difficult to keep as aquarium fishes, and few survive in captivity, due to their unique dietary requirements and susceptibility to disease (Vincent, 1997).
22. Syngnathid supply no longer meets international demand. In addition to the large, highly prized specimens that were harvested exclusively in past decades, a substantial proportion of the trade today consists of previously undesirable, smaller seahorses. For instance, in the Philippines, seahorses less than 100 mm were not harvested in the 1970s, while animals 50 mm or larger in size are taken today (Vincent, 1997). This trend indicates that juveniles and adults, as well as other previously unexploited species (of smaller adult size) are now vulnerable to harvest pressures.
23. Some pipefish species are exploited for traditional medicines and some are sold in the aquarium trade or as curios. Pipehorses of the genus *Solegnathus* are the most valuable syngnathids in TCM. Relatively small numbers of seadragons are sold as ornamental fishes, most commonly to public aquaria.

Fisheries

24. Seahorses, pipehorses, and pipefish are harvested in range countries through directed fisheries and as bycatch. Bycatch currently accounts for the majority of specimens intended for the TCM and curio markets, whereas directed fisheries are usually the source of live specimens for the pet trade, as well as a portion of the dried specimen trade. It is estimated that at least 20 million seahorses are captured annually from the wild (Vincent, 1996).
25. Bycatch of Syngnathids generally occurs in commercial fisheries directed at food fish or shrimp/prawns. The associated fishing methods are not conducive to the survival of individual syngnathids with long net deployment times, abrasion, and compression. India, Indonesia, and the Philippines exhibit significant bycatch fisheries for seahorses, which are almost entirely destined for export to the major importing TCM jurisdictions (China, Hong Kong, Taiwan). Although catch of seahorses per trip may be low, overall harvest by local fleets is significant. In terms of medicinal value, pipehorses rank above seahorses, which in turn outrank the smaller pipefish. Since seadragons (*Phycodurus eques* and *Phyllopteryx taeniolatus*) have no known TCM value, they are generally not retained for the medicinal trade.
26. Directed fisheries for Syngnathids usually involve individuals or small groups of harvesters who capture them in nearshore habitats. These are artisanal, or subsistence fishers, who generally sell their catch to local buyers. Large-scale, mechanized fisheries for live syngnathids are currently impractical, since populations are patchily distributed, slow to recolonize, and often found in shallow

areas that are not accessible with large gear. Typical methods employed in these fisheries are hand-catching, dip nets, and seines. Southeast Asian harvesters report that seahorse catches are higher during the monsoon season (October - February), ostensibly coinciding with onshore breeding migrations. Most aquarium specimens are exported to North America, Europe, and Japan. Countries that deal in live seahorses (e.g. Australia, Indonesia, and the Philippines) also appear to export pipefishes to Western countries for the pet trade, although these are not nearly as common as seahorses. The most commonly traded pipefish species in the aquarium industry is *Doryrhamphus dactylophorus*, with other species seen less frequently because of their limited value. Seadragons are rarely harvested for the pet trade because of regulations and husbandry problems (see below), and command extremely high prices (>US\$4,000 per animal) when they are captured alive. The Western Australian syngnathid aquarium fishery harvests a number of syngnathid species, including weedy seadragon (*Phyllopteryx taeniolatus*). In addition, a Victoria (Australia) company exports live leafy seadragons (*Phycodurus eques*) that have been captive raised.

Husbandry

27. Captive breeding programs designed to reduce pressure on wild populations have been generally unsuccessful, due to difficulties in rearing young, and the need for repeated removal of adults from the wild to maintain brood stock. Captive breeding programs existed in the 1950s through the 1980s in China, but economic failure (mainly due to high mortality rates and low productivity) forced closure of all these facilities (Vincent, 1997). Seahorse culturing was also attempted in the Philippines, because indiscriminate fishing was depleting populations; however, these activities have also been abandoned. The Seafarming Development Centre in Sumatra, Indonesia reports some success in seahorse culturing (53% survival of young), although this facility remains to be critically assessed. Captive breeding trials are under way in Viet Nam; however, it is too soon to determine the viability of these operations. As a result of newer technologies, an operation based in Tasmania, Australia has been successful to date in breeding F1 generation *Hippocampus abdominalis* (85% survival rate) with young surviving for over twelve months. Although the company has also bred F2 stock in limited numbers, it is too early to determine how successful the breeding operation will be in the long term. F2 generation stock of *H. abdominalis* and F1 stock of *P. taeniolatus* have also been produced by a Victorian (Australia) company. Private seahorse enterprises, at least in the U.S., strive for large-scale production of captive-bred animals beyond the F1 generation, through relatively advanced technology.
28. Although harvesters in some areas indicate that they are careful to ensure maximum survival of syngnathids; traditionally, wild-caught seahorses have been known to undergo extreme stress during capture and transport, due to water quality sensitivity and dietary needs that can be difficult to meet. Accordingly, captive-breeding, pet keeping, and public aquarium husbandry have been limited by high mortality rates and low reproductive success. In Australia, some harvesters who sell live syngnathids provide husbandry information sheets to purchasers in order to maximise syngnathid survival post sale. Recent information obtained from a U.S. private enterprise suggests that advances in aquaculture technology have eliminated many of the problems experienced in the past. Use of special flow-through seawater systems and enriched live foods have resulted in larval survival rates of 90% and juvenile survivorship as high as 80%. Captive-bred specimens from the F2 generation reportedly feed easily on prepared food, and are much hardier in aquarium conditions than their wild counterparts (Carol Cozzi-Schmarr, pers. comm.). The relatively high cost of producing captive-bred seahorses makes them less marketable in the presence of cheaper, wild-caught specimens.
29. In December 1998, Project Seahorse initiated an international aquarium workshop on seahorse husbandry, management, and conservation. Participants began developing a long term programme for resolving technical problems associated with seahorse husbandry (Vincent pers. comm.).

IMPORT AND EXPORT OF SYNGNATHIDS

Table 1. Primary importing countries/entities for dried seahorses

Country/ entity	Quantity used (tons/yr)	Value per kg (declared)	Value per kg (retail)	Number per kg	Period
Hong Kong	approx. 10	\$56	\$275-412 \$326-515 \$1200	330 265 65	1995
Taiwan	10-12	\$50-75	\$210-270 \$640-850	> 300 < 100	1991-1994
China	20	\$40-294	\$270-676	260	1990-1995

Source: All data is from Vincent 1997, with quantities and values extrapolated from published statistics and interviews.

Table 2. Quantity and value of seahorses from the major exporting countries

Country/entity	Commodity	Quantity exported	Value		Year
			Fisher	Buyer	
India	dried	3.6 tons	\$0.17-0.37 ea	\$62-118/kg	1995
Viet Nam	dried	5 tons	\$95-109/kg	\$118-127/kg	1995
Philippines	dried	3.5-11 tons	\$0.20-0.40 ea	\$112/kg	1993-1994
Philippines	live	> 500,000	\$0.20-0.36 ea	\$1.00-2.50 ea	1993
Indonesia	live	> 100,000	\$0.32-1.81 ea	\$0.68-3.62 ea	1995
USA	live	(imports)	Wholesale: \$5.00-9.40 ea		1993

Source: All data is from Vincent, 1997 and includes information from country statistics and interviews. The value is dependent on seahorse size, with top dollar paid for the largest animals.

30. New surveys of seahorse trade throughout Asia, Central America and the Caribbean are being undertaken by Project Seahorse during 1999. Current trade information reflects primarily on work conducted in Asia in 1993 and /or 1995, and requires updating. The new data will allow analysis of temporal change, and identification of particularly threatened populations. Given the paucity of written records, the effectiveness of such work depends on oral communication with stakeholders (Vincent pers. comm.).

Illegal trade

31. Relatively few political entities directly protect syngnathid species; protection simply does not exist at an international level. Israel, South Africa and the Australian national jurisdictions of Tasmania and Victoria fully protect all syngnathid species, including seahorses. On January 1, 1998, Australia became the first country requiring permits for exports of syngnathids; permits are only issued for animals derived from approved captive breeding programs, or from the wild under an approved management regime (Moreau, 1997). Inshore trawling is banned in Indonesia, Taiwan, and Thailand, providing indirect protection by protecting essential seahorse habitat (provided enforcement is adequate).

32. Although no official data exist, anecdotal information suggests that some illegal export trade in dried pipefish occurs from Australia. It has been suggested by some that listing seahorses in the CITES Appendices may drive the trade underground.

Conservation

33. To date, few conservation strategies have been implemented for the taxa. Seahorses are included in the French, Portuguese and Vietnamese Red Lists of Threatened Animals; however, trade is still legal. Two small-scale community-based seahorse management projects exist in Viet Nam and the Philippines; these include no-exploitation zones, holding pens for pregnant males, which are not killed until they give birth, reintroduction, and/or low-technology captive breeding (Vincent, 1995). In Bermuda there are non-specific harvest regulations that affect seahorses, including a ban on the aquarium fish trade.
- a) Cayman Islands: non specific harvest regulations that affect the harvest of seahorses.
 - b) France: strictly illegal to import tropical species under the name *H. kuda*, *H. ramulosa* (to be revised as *H. guttulatus*) listed in national Red Data Book.
 - c) Israel: trade in Red Sea seahorse and pipefishes forbidden.
 - d) Slovenia: *H. guttulatus* protected under *Government Order on the Protection of Threatened Animals Species* (October 1993), which prohibits trade and prohibits keeping them in captivity.
 - e) South Africa: harvest of *H. capensis* illegal without permit from Cape Nature Conservation (CNC) under CNC Ordinance 19, 1974. All syngnathids protected from harvest and disturbance except with permit (Draft Regulations of the Marine Living Resources Bill and Sea Fisheries Act 1988).
 - f) Viet Nam: lists *H. hystrix*, *H. japonicus*, *H. kelloggi*, *H. kuda* and *H. trimaculatus* as vulnerable in National Red Data Book.
 - g) Philippines: Project Seahorse initiated a National Conference Workshop on the Conservation and Management of Seahorses in the Philippines in May 1998. The meeting represented the first collective attempt to resolve the problem of seahorse over-exploitation in the Philippines. The participants made a strong call for action, and took initial steps toward an integrated plan for managing these valuable and poorly known fish species. The workshop laid down a template for action at the international level (Vincent pers. comm.)

Recommendations

34. The following actions are recommended to support and complement this initiative.

The Parties of CoP11 might, through a Decision of the Conference of the Parties:

- a) Directs the Animals Committee to review existing harvest and trade data on syngnathids within the scope of its activities under Decision 10.82 regarding implementation of Resolution Conf 8.9 in the context of species used in traditional medicines
- b) Direct the CITES Secretariat and the Animals Committee to work closely, whenever possible, with conservation initiatives of the traditional medicine industry, marine fish hobbyists, public aquaria, etc.
- c) Direct the CITES Nomenclature Committee to assist the efforts, whenever possible, of marine fish taxonomists in clarifying and resolving syngnathid taxonomy problems and evaluating the utility of syngnathid identification guides
- d) Request that the Parties, at the very minimum, assist the Animals Committee by providing anecdotal information and data on national syngnathid harvest, domestic and international use and trade, and summaries of regulations or legislation that address syngnathid harvest and trade
- e) Suggest that the Parties initiate or increase their national effort to collect basic information on syngnathid harvest including national species' distribution, types and method of harvest, socio-economics of fisheries, local markets and demand, etc.

- f) Suggest that the Parties work with their national customs agencies to acquire basic information on the volume and value of international trade through the use of a specific tariff code for syngnathid imports, exports, and re-exports
- g) Suggest that the Parties work more closely with their health agencies integrating syngnathid conservation efforts with traditional medicine initiatives
- h) Suggest that Parties review the possibility of an Appendix III listing of syngnathids where the harvest and trade has been shown to be, or is, unsustainable or detrimental to maintaining the taxa throughout its range at a level consistent with their role in the ecosystem in which they occur; or where illegal harvest and trade is found to be problematic
- i) Request that the CITES Animals Committee report on the progress made on this initiative and other related actions to the Twelfth Meeting of the Conference of the Parties

The traditional medicine industry needs to:

- j) Convene at least one international workshop to address the conservation and trade concerns on the harvest and trade of these taxa, targeting the traditional medicinal industry itself, but with the participation of national governmental wildlife, fisheries, and health agencies, wildlife conservationists, fishermen and local communities depending on these fisheries, the CITES Secretariat, and the CITES Animals Committee
- k) Prepare an identification guide to identify syngnathid species in international medicinal trade for dealers, practitioners, and governmental officials
- l) Promote the development of sustainable fisheries to ensure a sustainable supply
- m) Encourage import and acquisition from sustainable harvested fisheries or community-based captive-breeding programs
- n) Promote educational initiatives discussing the possible problems with current syngnathid harvest and trade levels, while offering remedial actions that can be undertaken by TCM consumers, practitioners, importers, and dealers

The hobbyist industry and public aquaria should plan to:

- o) Continue husbandry research, with a particular focus on low-tech, shallow water captive-breeding projects that may be accomplished by, and for the benefit of, subsistence-based fishers
- p) Promote the development of sustainable fisheries to ensure a sustainable supply
- q) Encourage import and acquisition from sustainable harvested fisheries or community-based captive-breeding programs
- r) Promote educational initiatives discussing the problems with current syngnathid harvest and trade levels, and offering remedial actions that can be undertaken by hobbyists and public aquaria
- s) Prepare an identification guide to identify species in international marine fish hobbyists' trade for importers, exporters, and other interested persons and organizations

The scientific community should:

- t) Continue research to further clarify and resolve taxonomic uncertainties
- u) Initiate or encourage research in seahorse ecology and biology, including juvenile dispersal mechanisms, natural lifespan, mortality rates, and population demographics

- v) Continue husbandry research, with a particular focus on low-tech, shallow water captive-breeding projects that may be accomplished by, and for the benefit of, subsistence-based fishers
- w) Work with governments to develop guidelines for sustainable levels of harvest and to reduce bycatch associated with other fisheries
- x) Work with governments to reduce the loss/destruction of mangrove and seagrass habitats, and restore important seahorse habitats
- y) Develop minimum information needs to model population dynamics and estimate maximum sustainable yield from wild populations
- z) Conduct trend analyses on available data to help quantify patterns in trade and, by proxy, population size.

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COMMENTS FROM THE SECRETARIAT

- A. The Secretariat welcomes this document but cautions against a major new initiative for a group of species not listed in any appendix of CITES, given the many pressing and seldom fulfilled obligations concerning many species that are already listed. As concern has been expressed about the impacts of international trade on the conservation status of syngnathid fish species, the focus of any new initiative should be to determine as soon as possible whether affected species qualify for inclusion in Appendix I or II. The Secretariat is, however, not in favour of the adoption of decisions concerning species not included in CITES-appendices.

- B. The Secretariat notes that syngnathids mostly occur in relatively shallow coastal water, i.e. within the territorial jurisdictions of Parties. Few countries appear to have taken any specific measures to regulate harvests or protect syngnathid habitat. Therefore it appears to be highly appropriate to establish, as a first step, domestic controls over the harvesting of such species where such controls are lacking. The Secretariat will accordingly support any initiative that would lead to improved domestic protection and management.

- C. This document refers to the application of Resolution Conf. 8.9 to trade in syngnathids (first recommendation directed to the Parties). The Resolution restricts the activities of the Animals Committee in this context to species included in Appendix II and this recommendation is therefore not appropriate.

CURRENT REPORTED TRADE IN SYNGNATHIDS

Australia

1. Seahorses and other Syngnathids in Australian waters are harvested and captive-bred/reared to supply the live aquarium trade and TCM. Australian syngnathids have been subject to export controls under the Australian *Wildlife Protection (Regulation of Exports and Imports) Act 1982* since 1 January 1998.
2. Australian export data indicates that most seahorses are wild-harvested using scuba gear and are sold live, for use as aquaria specimens. The most common species in trade include: *Hippocampus breviceps*, *H. abdominalis* and *H. angustus*. In Western Australia, seahorses for the export market are wild harvested juveniles. In 1998, this fishery included 306 specimens of *H. angustus* and 52 specimens of the common seadragon, *Phyllopteryx taeniolatus*. All *H. angustus* were exported to Japan.
3. Bycatch data from the Queensland trawl fishery indicates approximately 4000 kg of dried pipefish, representing at least 100,000 individuals, were exported in 1998. Two pipefish species that are used in traditional medicine practice, *Solegnathus hardwickii* and *S. dunckeri*, were exported primarily to Taiwan and Hong Kong, The Queensland Fisheries Management Authority is currently preparing management plans for the syngnathid trawl bycatch and marine aquarium fishery for approval under the Wildlife Protection Act.
4. The Australian Quarantine and Inspection Service (AQIS) administers the *Export Control Act 1982* and its subordinate regulations, the *Export Control (Processed Food) Orders*. The primary purpose of the *Orders* is to ensure that processed food intended for export is safe and wholesome for human consumption. It is important to note that the *Orders* do not apply to live fish exported as aquarium specimens. Therefore, AQIS is unable to monitor trade in live syngnathids exported for the marine aquarium trade. However, exports of syngnathids for human consumption are subject to AQIS permitting requirements. AQIS reported that 1559 kg of syngnathid specimens were exported from Australia between July 1995 and January 1997; this figure includes approximately 40 kg from New South Wales, 396 kg from northern Queensland, 854 kg from southern Queensland and 269 kg from Victoria. During 1997, 632 kg were exported, all from Queensland, and all but 64 kg (which was frozen) was dried product. Weight per syngnathid varies with species, size and processing.
5. As of 1 July 1999, persons exporting dried syngnathids are also required to obtain an export clearance numbers from the Australian Customs Service EXIT System. In doing so, exporters use a new Australian Harmonised Export Commodity Classification (AHECC). This process will enable improved monitoring of the dried syngnathid trade.
6. Syngnathids harvested from Victoria may be exported as wild-harvested or cultured specimens, or used as broodstock for captive breeding/rearing purposes. Recently, all syngnathids under Victorian fisheries legislation have been listed as Protected Aquatic Biota; harvest permit conditions have restricted collection to no more than ten specimens per species, annually. Syngnathid species harvested for export purposes in Victoria include *H. breviceps* and *H. abdominalis*, and ten other syngnathid species, including pipefish/pipehorses and the common seadragon, *Phyllopteryx taeniolatus*. In addition, captive-bred specimens of *H. abdominalis* and *H. breviceps* have been exported. Approval has been granted under the *Wildlife Protection Act* for the harvest of one egg bearing leafy seadragon (*Phycodurus eques*), from South Australian waters. Only captive hatched or bred leafy seadragons from this operation may be exported.
7. Kuitert (1997) reports the following exports of *H. abdominalis* from Victoria, for the years 1994 to May 1997. The number of cultured specimens replacing wild stock are noted as well.

Table 3. Exports of *H. abdominalis* from Victoria, Australia 1994-1997

Year	Cultured	Wild	Total exports
1994	42	31	73
1995	45	–	45
1996	91	14	105
to May 1997	59	8	67

Source: Kuitert, 1997.

8. During 1999, a Tasmanian seahorse aquaculture operation will be exporting captive bred *H. abdominalis*, as trial shipments, that will include an estimated 5,000 seahorses to six destinations in Singapore, Hong Kong, Taipei and Korea. This operation plans to export 5 tons of captive-bred *Hippocampus abdominalis* in 2000 for medicinal purposes, and projects a four-fold increase in production during 2001.

China

9. The CITES Management Authority of China (CNMA) reports seven species of seahorses in Chinese coastal waters: *H. coronatus*, *H. histrix*, *H. erinaceus* (= *angustus*), *H. kuda*, *H. japonicus*, *H. trimaculatus*, and *H. kelloggi*. Under the *Wildlife Protection Law of 1981*, *H. kelloggi* is fully protected and trade is controlled; permits are required for import or export. Imports and exports of other seahorse species are not controlled. CNMA doubts the accuracy of current estimates indicating that 20 tons of seahorses are imported into China annually. While noting that demand and fishing pressure have increased in recent years, officials believe seahorses are common (i.e., not protected in range countries), widely distributed, experience low natural mortality, a high reproductive rate, and rapid juvenile growth. CNMA does not believe that seahorses meet the criteria for inclusion in Appendix II of CITES.

Europe

10. The European Union listed seahorses on Annexe D of its wildlife trade regulations in 1997 and now monitors imports.

Germany

11. The Federal Agency for Nature Conservation reports a total of 9 live *Hippocampus* spp. imported during 1998, and only one specimen traded in 1997.

Hong Kong

12. The Hong Kong Census and Statistics Department began documenting seahorse and pipefish trade on 1 January 1998. The Endangered Species Advisory Committee reports that Hong Kong has only recently begun collecting syngnathid import data; therefore, very little data is available. Officials report incidental harvest only, due to reduced population levels. The following syngnathids are known to inhabit Hong Kong's coastal waters: *H. kuda*, *H. trimaculatus*, *Syngnathus sohlegeli*, and *Hippichthys cyanospilus*. The Endangered Species Advisory Committee consulted researchers in the Department of Ecology and Biodiversity at Hong Kong University regarding trade in syngnathids. The Committee reports that the researchers had recorded "very low numbers of seahorses for sale in local aquarium shops" and believe these specimens to be imported. In addition, "they know nothing of the trade for TCM" While the Committee agrees that measures should be taken in the near future to conserve seahorses, they believe that a CITES listing at this time might drive the trade underground, and indicate the importance of engaging the consumer, as well as trade entities, in a continuing dialogue with the goal of managing seahorse populations realistically. The Committee advocates establishment of a Marine Fish Working Group at the next Conference of the Parties.

Jamaica

13. The Natural Resources Conservation Authority reports at least two species of seahorses in Jamaican waters: *H. erectus* and *H. reidi*. There is no seahorse fishery in Jamaica and no comprehensive information exists regarding trade and status of the genus.

Japan

14. The Fisheries Agency of the Ministry of Agriculture, Forestry, and Fisheries, in response to an inquiry regarding the possibility of a proposal to list seahorses in Appendix II of CITES, replied that there is no commercial fishery for seahorses in Japan; therefore, there are no catch statistics. Although catch volume is unknown, they believe that the volume is "probably close to zero". The following species inhabit the coastal waters of Japan: *H. coronatus*, *H. takakurai*, *H. kudo*, *H. hystrix*, *H. japonicus*, and *H. sindonis*.

15. Seahorses are imported for use as pets, food, and TCM. The volume of imports and exports is unknown; trade data for seahorses are not collected. There are no harvest regulations that specifically protect seahorses; however, entry into the trawl fishery is limited and some areas containing coastal seagrass beds are protected by "fishery related statutes". Neither the protected areas, nor the specific statutes were identified.

16. Under the *Pharmaceutical Affairs Law*, production, importation, and sale of pharmaceutical products must be approved and licensed. Seahorses and their parts are an essential ingredient in many TCM preparations. Officials do not believe that seahorses meet the criteria for inclusion in Appendix II of CITES.

Ireland

17. National Parks and Wildlife report no records of imports or exports of *Hippocampus* spp.

Luxembourg

18. The Luxembourg Ministry of the Environment advises no reports of imports or exports of *Hippocampus* spp. during the past three years.

New Zealand

19. The New Zealand Ministry of Fisheries provides the following data on syngnathid bycatch (green weight), which is sold to licensed fish receivers and may be exported. NZ Fisheries suggests that the data is likely an under-estimation, and there are large variations in catch from year to year. For example, some fishers will only catch a few seahorses that are then discarded, while seahorses that are harvested in large numbers in a trawl may be retained for subsequent sale. This variation also applies to pipefish; in 1995 there were very large by-catch quantities for pipefish species.

Table 4. Reported Syngnathid by-catch in New Zealand, 1991-1998

Year	Syngnathid	Quantity (kg) wet weight
1991	Seahorse (<i>H. abdominalis</i> ?)	21
1993	Pipefish	208
1994	Pipefish	1071
1995	Pipefish	5451
1996	Pipefish	448
1997	Seahorse	71
1998	Pipefish	41

Source: New Zealand Ministry of Fisheries.

Portugal

20. SA Portugal reports the following undated imports:

- *Hippocampus kuda*: 4 from Sri Lanka, and 5 from Singapore
- *H. takakurae*: 11 from Singapore
- *Hippocampus* spp.: 6 from Singapore.

Singapore

21. The Singapore Red Data Book lists the species *H. kuda*, as vulnerable. Inhabiting local seagrass beds and coral reefs, this species is collected for medicinal purposes and the live pet trade. The Primary Production Department of Singapore reports that seahorses are imported for medicinal purposes, but the amount of trade through Singapore is minimal. Trade data was not available.

Sweden

22. The Swedish Environmental Protection Agency reports limited trade in *Hippocampus* spp. During 1997, importation of 64 specimens were reported; in 1998 imports increased to 303 specimens. Import figures are believed to be an under-estimate of actual trade.

Taiwan

23. The Fisheries Administration of the Council of Agriculture reports that catch data are unavailable, as syngnathids are not recognized as targeted fishery species in Taiwan. Proof documents issued by the Fisheries Administration for live specimens of *Hippocampus* are required to obtain clearance of imports. Live specimens are imported for sale to the pet trade. Syngnathids are not listed as protected species under the *Wildlife Conservation Law*.

24. The Chinese Medicine and Pharmacy Committee, Department of Health, has issued over 15,600 TCM permits. Of these, 13 preparations incorporate seahorses and one contains pipefish.

25. The Board of Foreign Trade, Ministry of Economic Affairs allows the import and export of seahorses and pipefish without licensing. However, import regulation code 502, pertaining to import of commodities for Chinese medicinal use, stipulates the following: 1) importation is limited to dry goods only, 2) a copy of either a Chinese medicine business license or a pharmaceutical manufacturing license is required upon import, and 3) the import must be clearly designated as medicinal product, including the product's name in Chinese.

26. The Directorate General of Customs, Ministry of Finance provided the following data detailing imports and exports between 1996 and 1999. In comparison to imports, there were relatively few reported exports from Taiwan. During the years 1996 through June 1999, there were no reported exports of *Syngnathus* species. Over the same period, 185 kg of seahorses valued at US \$20285 were exported to Hong Kong in 1997, and 98 kg of seahorses valued at US \$816 were exported in 1998, again to Hong Kong. Taiwan Customs statistics have recorded syngnathid trade for at least 15 years (A. Vincent, pers. comm.).

Table 5. Quantity and value of seahorses and pipefishes imported to Taiwan, 1996-1999

Species	Country of export	1996		1997		1998		1999 ¹	
		Q ²	V ³	Q ²	V ³	Q ²	V ³	Q ²	V ³
Seahorse (Hai Ma)	Indonesia	34	93	0	0	22	29	0	0
	China	497	838	810	1,515	587	756	0	0
	Malaysia	152	519	64	180	302	621	0	0
	Philippines	290	555	136	265	196	449	172	142
	Singapore	0	0	0	0	113	202	0	0
	Thailand	9,399	10,740	8,886	16,653	6,144	14,492	2,655	4,914
	Viet Nam	27	91	0	0	0	0	40	70
	Total	10,399	12,836	9,896	18,613	7,364	16,549	2,867	5,126
		(466,585)		(655,953)		(490,080)		(163,519)	
Pipefish (Hai Lung)	Australia	501	1,597	800	2,105	784	1,323	186	312
	China	114	41	1,129	372	3,145	974	5,962	917
	Malaysia	179	251	0	0	0	0	0	0
	New Zeland	0	0	0	0	1,167	161	0	0
	Singapore	0	0	0	0	58	190	0	0
	Thailand	6,904	2,393	828	840	824	689	1,843	3,184
	Viet Nam	0	0	0	0	0	0	40	8
	Total	7,698	4,282	2,757	3,317	5,978	3,337	8,031	4,421
		(155,628)		(114,994)		(96,182)		(141,029)	

Source: Data provided by Directorate General of Customs, Ministry of Finance.

¹ 1999 data incomplete, January through June reported.

² Q= Quantity.

³ V= Value. Monetary units are in Taiwan dollar (NT) x 1000, unless otherwise noted.

() Figures in parentheses represent approximate value in US dollars.

United Kingdom

27. The Joint Nature Conservation Committee reports the following seahorse importation data; however, they consider the data are an under-estimation of actual trade, especially specimens used for curios and traditional medicine. During the period 1 June 1997 to 31 December 1998, total imports were as follows:

Place of origin	Total
Singapore	10
Indonesia	81
Philippines	5 (live)
China	200 boxes herbal product (volume/weight TBA)

United States of America

28. Inquiries were sent to coastal States within the United States to determine the status of syngnathid populations and trade levels. A summary of responses follows.
29. The waters of the State of Alabama are home to *Hippocampus erectus*, which is considered common by the Department of Conservation and Natural Resources. *H. zosterae* occurs in nearby Mississippi waters and may stray into Alabama's waters. There is believed to be a small component of bycatch in the shrimp trawl fishery. Permits are not required for harvest, and there are no specific statutes or regulations covering syngnathid species. There is no evidence of illegal trade, and scientific investigations are not being conducted at the present time.
30. Connecticut does not have a commercial fishery; occasionally individuals are taken for home aquaria. State officials are uncertain whether harvest for TCM use and curios occurs. While pipefish are fairly common (but small), seahorses are extremely rare. Permits allowing take are not required and there are no existing statutes, fishing regulations or management plans for syngnathids. Scientific investigations have not been conducted.
31. The Delaware Department of Natural Resources and Environmental Control, Division of Fish and Wildlife reports the presence of *H. erectus* and *S. fuscus* in state waters. There is no available trade or harvest data, permits are not required, and there is no evidence of illegal trade.
32. The Florida Fish and Wildlife Conservation Commission reports that syngnathid species are covered under the *Florida Marine Life Rule*. This rule requires an individual to possess a Saltwater Products License, a restricted species endorsement, and a marine life endorsement to collect and sell on a commercial basis in the state of Florida. There are also live landing and live well requirements. The recreational bag limit is no more than 20 individuals per day of marine life species, in any combination. Gear types allowed for harvest of marine species include hand-held net, barrier net, drop net, slurp gun, quinaldine (with a special activity license), roller frame trawl (if the marine species are taken as by-catch in the shrimp trawl fishery), and a trawl specifically designed to target the dwarf seahorse, *H. zosterae*.
33. The primary Syngnathidae species commercially landed in Florida are: dwarf seahorse (*H. zosterae*), lined seahorse (*H. erectus*), and sargassum pipefish (*Syngnathus pelagicus*). Dealers must report landings on mandatory trip tickets. The largest number of seahorses appear to be caught for sale as curios. The following table summarizes Florida syngnathid catch from 1991- 1998.

Table 6: Florida syngnathid catch by species, value, trips, dealers and licensed fishers, 1991-1998

Year	Species	Numbers	Trips ¹	Value ²	#Dealers ³	#SPLS ⁴
1991	Sargassum pipefish	2,093	116	649	18	31
	Dwarf seahorse	7,226	84	5,361	14	29
	Lined seahorse	6,850	375	10,215	24	46
	Other seahorse	4	1	1	1	1
	Total	16,173	576	16,226	32	67
1992	Sargassum pipefish	1,788	162	814	17	22
	Dwarf seahorse	76,706	141	3,846	17	16
	Lined seahorse	7,250	448	10,932	25	41
	Other seahorse	61	20	10	7	11
	Total	85,805	771	15,602	35	54
1993	Sargassum pipefish	1,670	210	2,088	20	35
	Dwarf seahorse	66,440	118	4,656	20	20
	Lined seahorse	1,900	136	3,284	20	34
	Other seahorse	3,475	413	548	4	23
	Total	73,485	877	10,576	37	69

Year	Species	Numbers	Trips ¹	Value ²	#Dealers ³	#SPLS ⁴
1994	Sargassum pipefish	1,419	233	1,135	14	22
	Dwarf seahorse	98,779	117	86,907	17	20
	Lined seahorse	2,231	122	9,900	19	29
	Other seahorse	9,938	302	917	5	14
	Total	112,367	774	98,859	33	59
1995	Sargassum pipefish	733	39	1,827	9	12
	Dwarf seahorse	22,662	61	23,023	13	13
	Lined seahorse	598	95	1,578	14	17
	Other seahorse	81	7	284	3	4
	Total	24,074	202	26,712	25	36
1996	Sargassum pipefish	1,400	43	3,730	11	15
	Dwarf seahorse	17,805	53	22,877	11	14
	Lined seahorse	1,120	101	2,293	9	21
	Other seahorse	112	4	282	4	4
	Total	20,437	201	29,182	22	40
1997	Sargassum pipefish	2,309	46	6,468	15	17
	Dwarf seahorse	87,916	57	27,462	14	15
	Lined seahorse	1,986	159	4,123	20	29
	Other seahorse	147	12	306	5	6
	Total	92,358	274	38,359	35	48
1998	Sargassum pipefish	1,019	76	1,149	13	15
	Dwarf seahorse	15,564	79	10,262	15	16
	Lined seahorse	1,180	123	3,128	16	20
	Other seahorse	233	13	274	4	6
	Total	17,996	291	14,813	29	34

Source: Florida Fish and Wildlife Conservation Commission.

¹ Trips is the number of trips landing a particular species in a given year; some trips encounter more than one species.

² Value in U.S. Dollars. Numbers rounded to the nearest dollar.

³ # Dealers contains the number of wholesale or retail dealers that reported seahorse and pipefish landings. Total in each cell is the total number of dealers for a given year; some dealers traffic in more than one species.

⁴ # SPLS contains the number of fishermen (Saltwater Products Licenses) that reported seahorse and pipefish landings. Total in each cell is the total number of fishermen for a given year; some fishermen target more than one species.

34. Maine's Department of Marine Resources reports that there is no information or regulation of syngnathid species in state waters.
35. The Maryland Department of Natural Resources reports that pipefish are commonly found in submerged aquatic vegetation (SAV) beds in Chesapeake Bay, and both pipefish and seahorses inhabit SAV's in Maryland's coastal bays. Harvest and trade data are not collected. There are no regulations or statutes specifically designed for syngnathids; however, restrictions on the use of commercial gear in SAV beds are currently being developed. State permits are not required and there is no evidence of illegal trade. There are, at present, no directed investigations of syngnathid species.
36. Massachusetts officials report that pipefish are "very common" in the state, but seahorses are rarely found in state waters. There is no harvest or trade in syngnathids. Although there are no specific regulations for take of syngnathids, all fishers harvesting fish for sale in Massachusetts are required to possess a Commercial Fishermen Permit. There is no evidence of illegal trade, and scientific investigations have not been conducted.
37. The State of New Jersey's Department of Environmental Protection, Division of Fish, Game and Wildlife reports that there is no known commercial harvest of syngnathids in state waters.
38. North Carolina does not collect syngnathid data.

39. The Rhode Island Department of Environmental Management, Division of Fish and Wildlife reports that finfish surveys in Narragansett Bay and the coastal ponds of Rhode Island have identified specimens of the common pipefish, *Syngnathus fuscus*, and the seahorse, *Hippocampus hudsonius*. Trade data is not collected, permits are not required, and there is no evidence of illegal or undocumented trade or harvest.